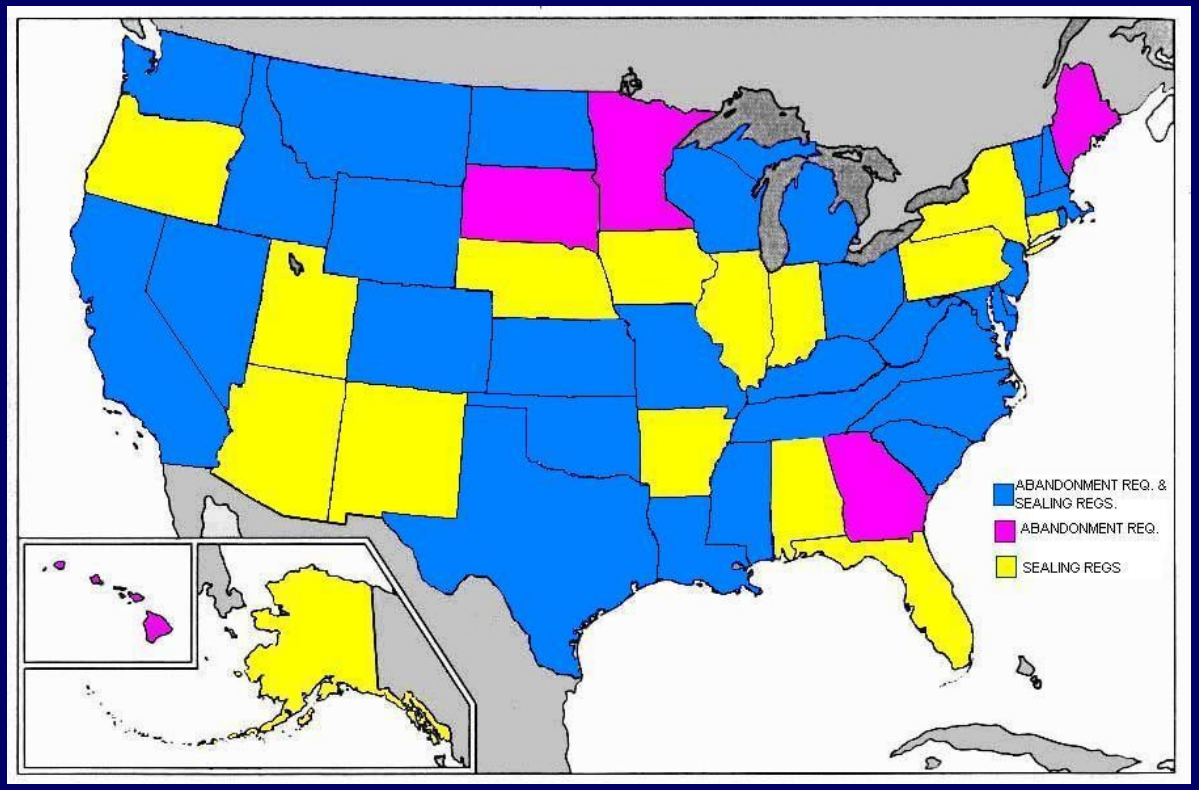
MANAGING YOUR MONITORING WELL NETWORK

- Monitoring Well Inventory
- Well Inspection and Rehabilitation
- Well Decommissioning
- Ground-Water Monitoring Program
  Evaluation and Operation

STATE DECOMMISSIONING REQUIREMENTS



BLUE – Decommissioning & plugging requirements
PINK – Decommissioning requirements
YELLOW – Plugging requirements

WHY MANAGE YOUR WELLS?
Benefits!

- Achieve compliance with state well maintenance and closure requirements
- Develop accurate well location maps and

  well design databases
- Repair or replace old wells using current technology
- Properly mark existing wells

WHY MANAGE YOUR WELLS?
Benefits!

- Eliminate nonfunctional and unneeded wells
- Restore the hydrogeologic characteristics of the site
- Remove potential conduits of contamination
- Remove unsightly wells
- Reduce obstacles for mowers, earth-moving or other equipment

WHY MANAGE YOUR WELLS?
Benefits!

- Complete formal “closure” of a site
- Reduce costs of sampling, analysis, and data management
- Properly document and report decommissioned wells

INFORMATION NEEDS

- Where are all of the monitoring wells?
- What is their usage status?
- What is their physical condition?
- Do any need to be repaired? If so, can they be repaired and how can they be repaired?
- Which wells should be decommissioned?
- What are the regulatory requirements for decommissioning the wells?

MONITORING WELL INVENTORY
Where are the monitoring wells?

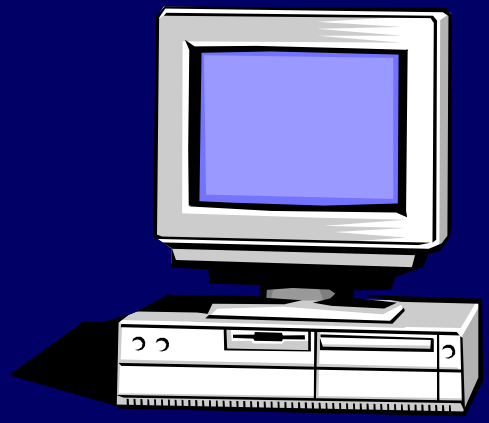
- Review installation, county, state, Federal and other records to locate wells
- Verify the locations by physically visiting the wells
- Use Global Positioning System to obtain well position coordinates

MONITORING WELL INVENTORY
Are the wells needed?

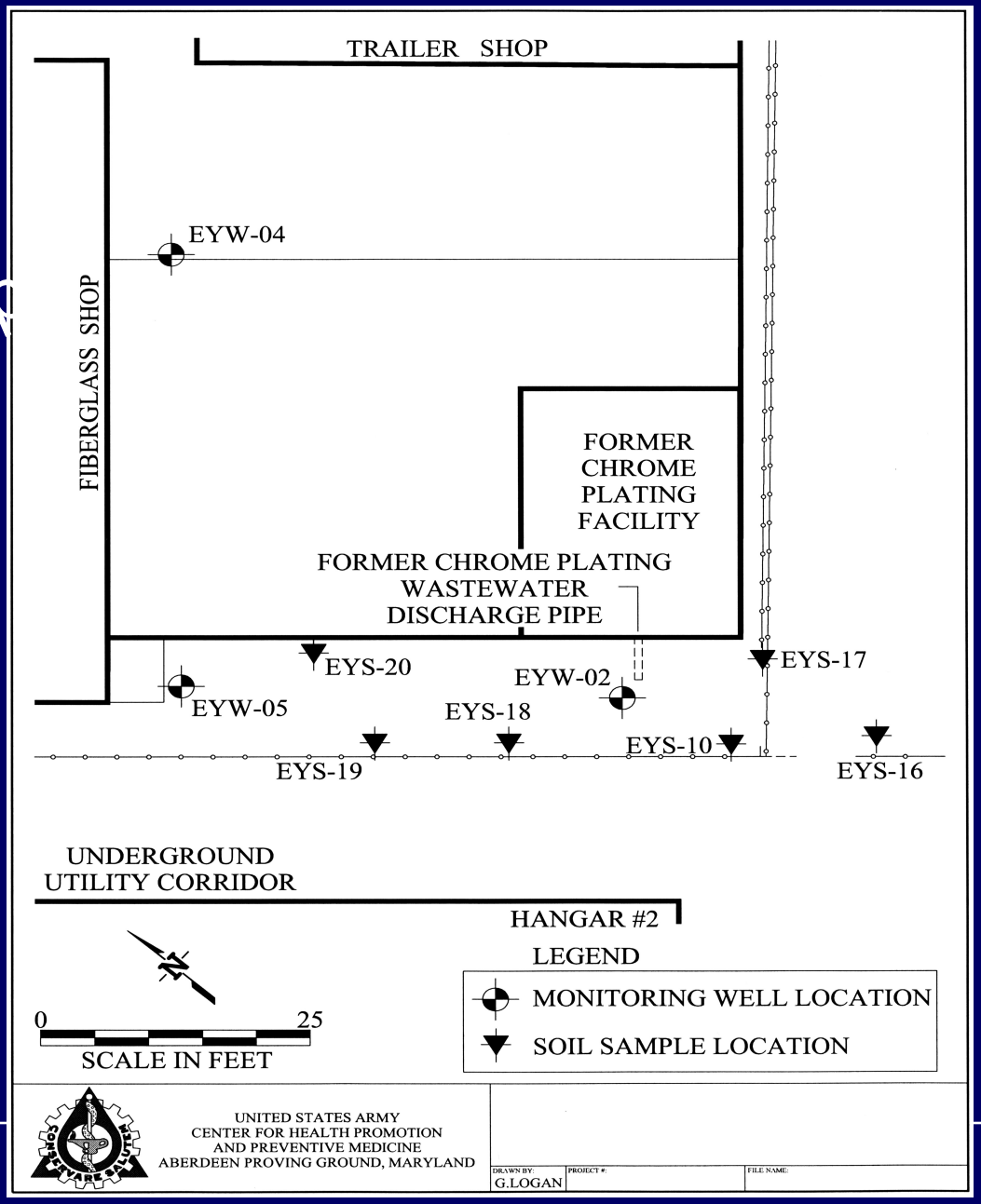
- Determine the purpose of the well or well network
- Are the wells still being monitored for the intended purpose?
- Is there any future need for the wells?

Monitoring Well Inventory
Resulting Products

- Accurate well location maps in electronic and hard copy
- Global Positioning System coordinates for each well
- Database for organizing and utilizing well information in format preferred by customer



Well Location Map



WELL DECOMMISSIONING DATA

Monitoring Well Number	Well Casing Diameter In Inches	Well Casing Material	Depth In Feet	Water Level In Feet	Cement Grout Interval In Feet	Latitude	Longitude
MO-88-2444	4"	PVC	23.5	9.1	0--23.5	39° 02.011	077° 02.540
MO-88-2445	4"	PVC	25.8	8.98	0--25.8	39° 02.016	077° 02.506
MO-88-2446	4"	PVC	26.8	11.39	1.5--26.8	39° 02.028	077° 02.492

MONITORING WELL INSPECTION

Physical and Functional Status of the Well

- Evaluate the condition of the well pipe, protective casing, lock, and concrete pad
- Measure well depth and compare to original depth to determine amount of siltation
- Conduct downhole camera inspections
- Pump or bail the well to check performanc
- Determine if wells are properly registered
- Evaluate the adequacy of the well markin

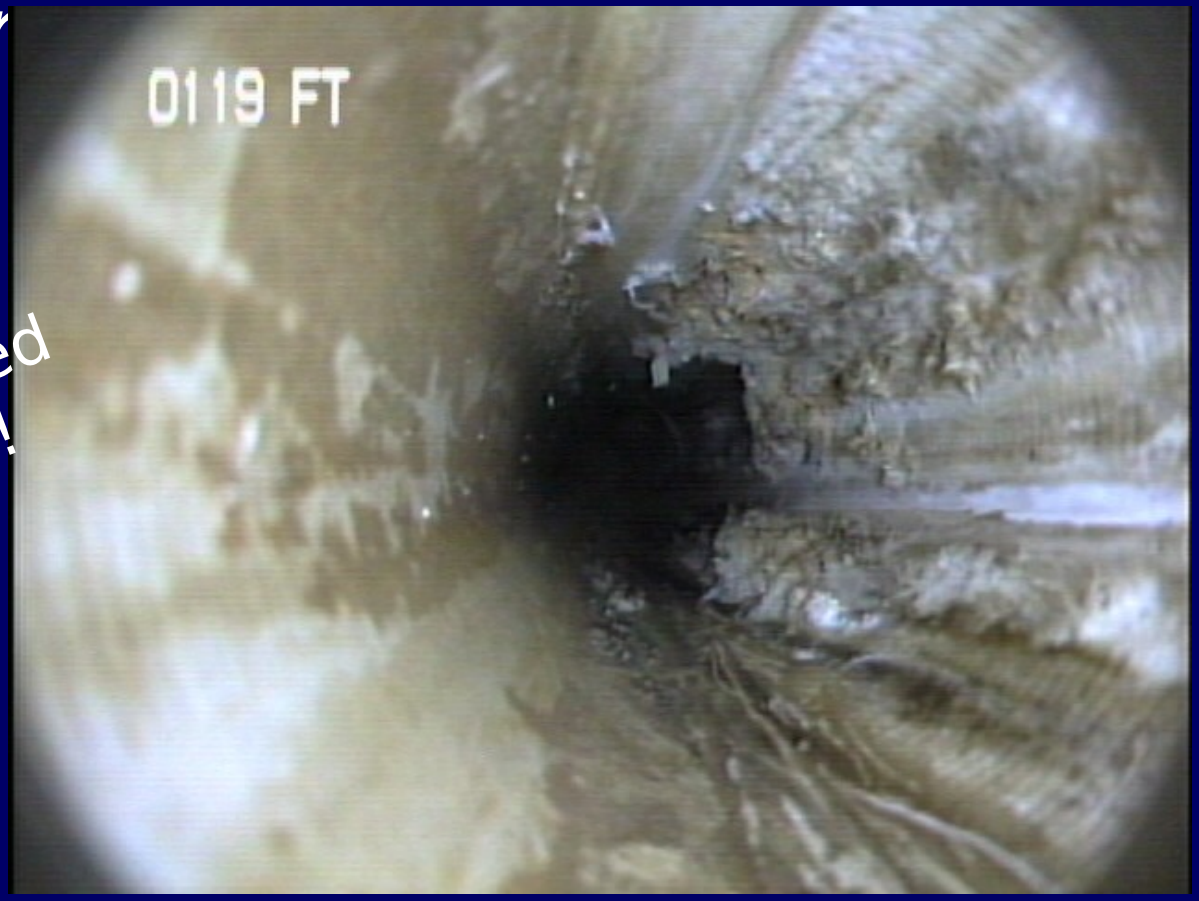
DOWNHOLE CAMERA SHOT

Bailer in Bottom of Well

DOWNHOLE CAMERA SHOT
Top of Bailer in Bottom of Well

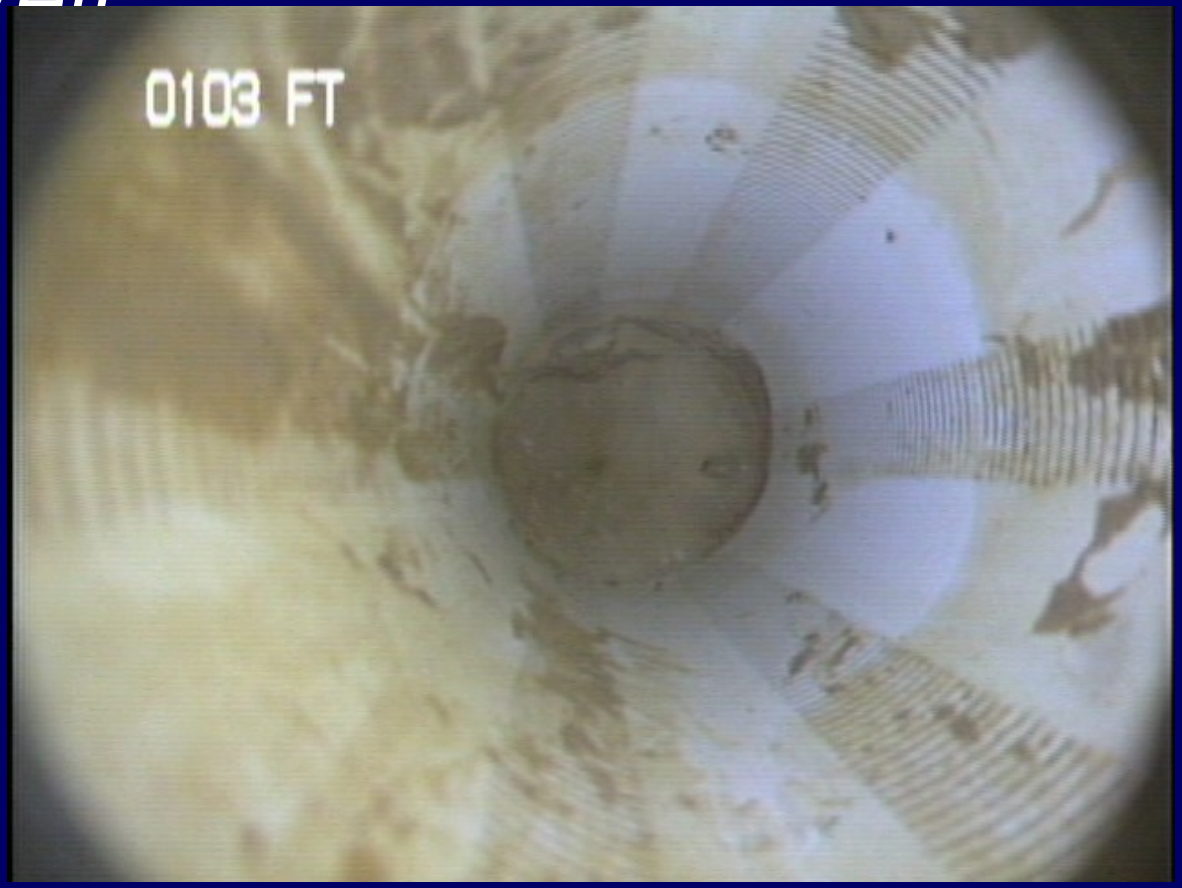
DOWNHOLE CAMERA SHOT
Silt and Debris in Bottom of W

DOWNHOLE CAMERA SHOT
Mold/bacteria Along Well Scr



Can be cleaned with brushes!

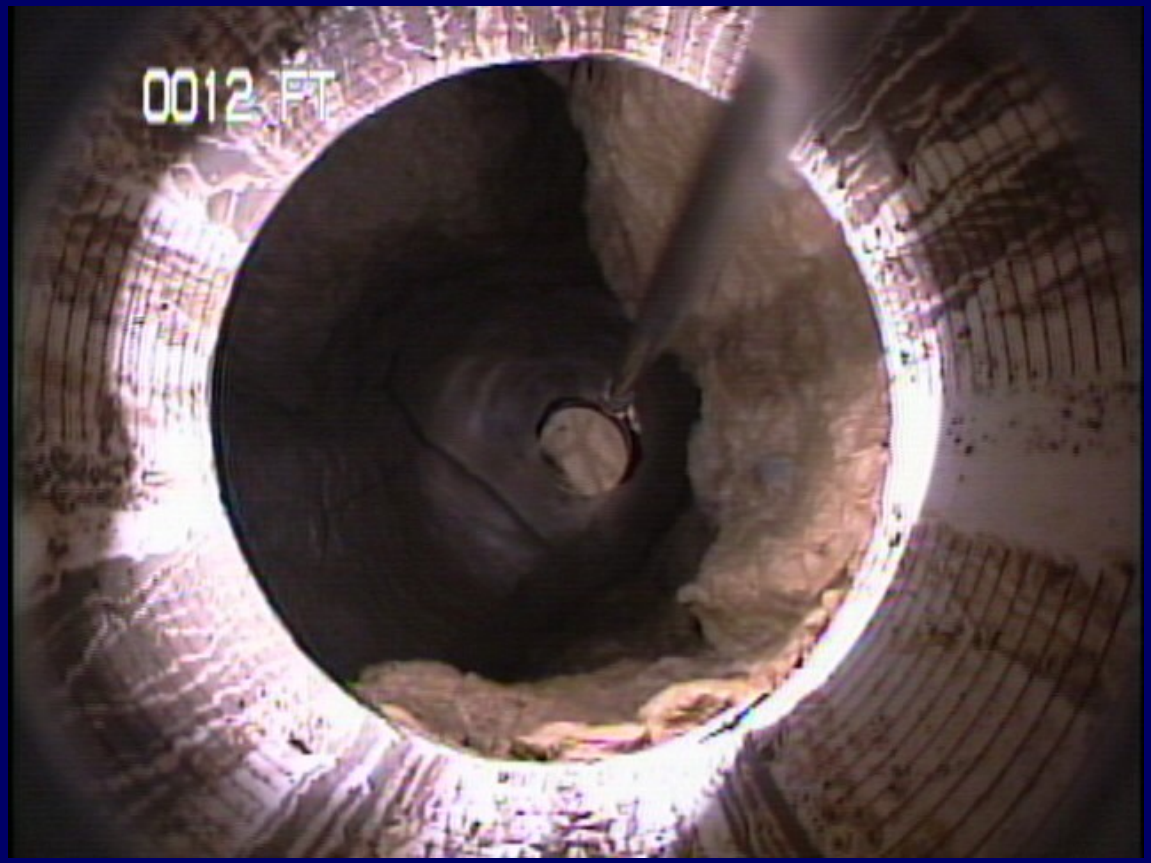
DOWNHOLE CAMERA SHOT
Silt on Walls and in Bottom of Well



DOWNHOLE CAMERA SHOT

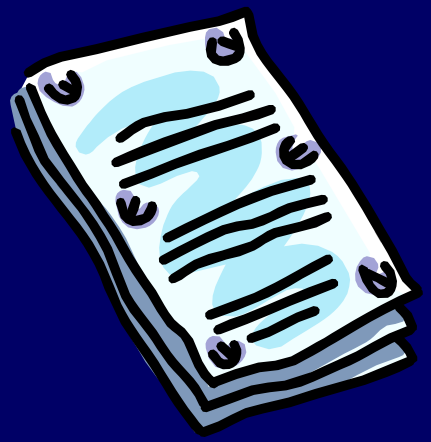
Silt and debris in bottom of well

DOWNHOLE CAMERA SHOT
Using a mirror



Monitoring Well Inspection
Resulting Products

- Well inspection reports for each well
- Proper registration of monitoring wells
- Metal plates at each well with well data
- Knowledge and photo documentation of well conditions

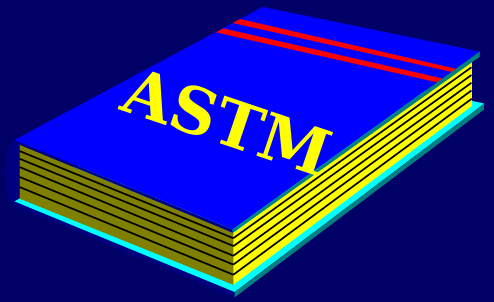


MONITORING WELL REHABILITATION
Which wells do we repair ?

- Determine if wells should be repaired based on well condition and usage status
- Decide whether to repair or replace the well based on the extent of damage and performance requirements

MONITORING WELL REHABILITATION
Methods of repair

- ASTM Standard (D5978) - Guide for Maintenance and Rehabilitation of Ground-Water Monitoring Wells
- Redevelopment to remove silt and restore flow
- Cleaning the well screen to remove silt, mold, or bacteria
- Replacement of riser pipe, protective casing, lock, and/or concrete pad



MONITORING WELL REHABILITATION
End Results

- Fully functional monitoring wells
- Improved aesthetics associated with wells
- Proper protection and security for monitoring wells

MONITORING WELL DECOMMISSIONING
Planning

- Review well construction data, inspection reports, and water chemistry
- Identify state decommissioning regulations
- Select a decommissioning method based on regulatory requirements, compatibility of materials, and future land use
- Contact local well service contractor to tap experience in local conditions

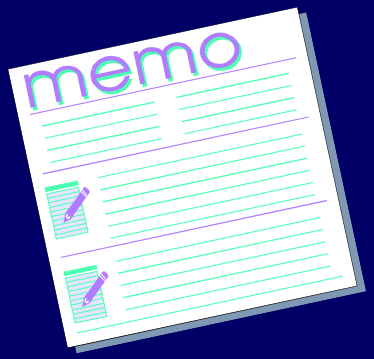
MONITORING WELL DECOMMISSIONING
Procedures

- Remove casing from ground by pulling or overdrilling
- Or, leave casing in place and perforate the screen and casing
- Precondition the borehole by removing mud from the walls
- Calculate the volume of plugging material needed

MONITORING WELL DECOMMISSIONING
Procedures

- Pump plugging material through a grout pipe starting from the bottom of the hole
- Monitor the material coming out of the well to determine when the undiluted grout has reached the surface

MONITORING WELL DECOMMISSIONING
End Results



- Properly decommissioned wells (IAW ASTM Standard D5299 and state standards)
- Regulatory compliance
- Eliminates conduits to ground water that could convey pollutants
- Completion of narrative report and required forms documenting the decommissioning
- Removal of unsightly monitoring wells

BEFORE AND AFTER

MONITORING PROGRAM EVALUATION AND OPERATION

Using Your Well Networks

- Develop or evaluate ground-water monitoring programs
  - suitable number & locations of wells
  - appropriate monitoring frequency and chemical analytes
- Perform periodic ground-water sampling and analysis
- Assess ground-water flow rate and direction using slug tests and water elevation measurements

MONITORING WELL SERVICES
For assistance . . .

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM)

Mr. Wayne Fox – (410) 436-5238

Wayne.Fox@apg.amedd.army.mil

http://chppm-www.apgea.army.mil/gwswp

- Other services are available – soil and ground-water sampling, monitoring well installation, Site Inspections, and more!